of two parts, a central portion and the surrounding zone. The pyrenoid is influenced by its environment, and easily becomes swollen and dissolved, leaving vacuoles in its place. Such a compound structure of the pyrenoid is shown only in the stained preparation, and when it is not differentiated with stains the pyrenoid appears quite homogeneous. SCHMITZ'S description of the pyrenoid as a homogeneous body may perhaps be based upon the unstained material.—SHIGÉO YAMANOUCHI.

Karyokinesis in Oedogonium.—Since STRASBURGER'S and KLEBAHN'S work on Oedogonium, there had been little published on mitosis in this form until WISSELINGH'S paper appeared. STRASBURGER'S material was *O. tumidulum* Kg., KLEBAHN'S *O. Boscii* Witte, and WISSELINGH'S material was *O. cyathigerum* Witte,[6] fixed in Flemming's solution. After being left in the solution for one day, it was treated with 20 per cent. chromic acid. By the action of the Flemming solution and the chromic acid solution, the cell wall and cell contents become entirely dissolved, and the nuclear membrane is also dissolved by the action of 20 per cent. chromic acid solution. The chromosomes during mitosis were studied in their isolated condition.

The chief points of interest are as follows: The mitosis in Oedogonium agrees with that of higher plants; the development of chromosomes out of the nuclear network, the formation of the nuclear plate, the longitudinal splitting of the chromosomes, the reconstruction of daughter nuclei seem like these processes in Fritillaria and Leucojum, two forms which were also studied by VON WISSELINGH. In Oedogonium, the chromosomes, 19 in number, and differing greatly from one another in length, are connected by fine fibrils. The nucleolus does not take part in forming chromosomes, but disappears at the beginning of mitosis, and there appear in daughter nuclei new nucleoli, which later unite into one.—SHIGÉO YAMANOUCHI.

Mycorhiza.—PEKLO announces in a preliminary paper[7] the results of his studies on the epiphytic mycorhiza of Carpinus and Fagus, with brief reference also to the endophytes of *Alnus glutinosa* and *Myrica Gale*.

In Carpinus, as a reaction to the penetration of the tissues of the young rootlet, tannins increase (as the author has also determined for Monotropa[8]), and this restricts the fungus to the intercellular spaces. Nourishing itself partly on this glucoside and other foods in the cortex, the fungus forms the jacket, the outermost hyphae of which often die. Isolation of the fungus was finally accomplished by using a decoction of old thick mycorhizas, which proved very specific for the

[6] WISSELINGH, C. VON, Ueber die Karyokinese bei Oedogonium. Beih. Bot. Centralbl. 23:139–156. *pl. 7.* 1908.

[7] PEKLO, J., Beiträge zur Lösung des Mykorhiza-Problems. Ber. Deutsch. Bot. Gesells. 27:239–247. 1909.

[8] ———, Die epiphytischen Mykorhizen nach neuen Untersuchungen. I. *Monotropa Hypopitys* L. Bull. Böhm. Akad. Wiss. 00:000. 1908.

infecting fungus. In this the inner hyphae began to grow and broke through the outer layers, and on this mycelium, whose origin was clear, conidiophores and conidia arose within three days. These showed it to be a Penicillium (Citromyces) very like *P. geophilum*, and similar results were reached with Fagus. Fungi of this group were also found in the forest soil where mycorhiza of Fagus was abundant. Carpinus was not available for experiments on reinfection, but a considerable number of young roots of a two-year-old Fagus showed infection from pure cultures of the Carpinus mycorhiza, as well as from several other species of forest Penicillia.—C. R. B.

Respiration.—For about a dozen plants Mme. MAIGE has determined the amount of O_2 fixed and CO_2 evolved by the stamens and pistils as compared with an equal weight of leaf tissue, both in air and in pure hydrogen.[9] She finds both aerobic and anaerobic respiration, tested thus, to be much (2–18 times) more active in the floral organs than in the leaf; and, with one exception, more vigorous in the pistil than in the stamen, and in the anther than in the filament. These results confirm the early ones (1822) of DE SAUSSURE, as to the relative rate of respiration of the floral organs and the leaves; but DE SAUSSURE found stamens more active than pistils. For the conciseness of this paper Mme. MAIGE is much to be commended.

JENSEN[10] finds that the alcoholic fermentation of sugar proceeds by two stages and he therefore predicates two enzymes, glucose being split by dextrase (glucase ?) into dioxyacetone and this by "dioxyacetonase" into CO_2 and alcohol. But in respiration, with oxidase and free oxygen present, the dioxyacetone, produced as in fermentation, breaks up into CO_2 and water, the main end-products of aerobic respiration.—C. R. B.

Transpiration.—SAMPSON and ALLEN, declaring that too little account has been taken of the effect of physical factors on transpiration, furnish further data on this subject.[11] Comparing evaporation from equal areas in equal times they find that there is little variation for plants of the same species under the same conditions of development and exposure; that of the same species the sun form evaporates 2–4 times as much as the shade form, whether the two are tested in the sun or shade, a difference which they ascribe chiefly to the greater number of stomata in the sun form (20–60 per cent.); that the increased evaporation with altitude, *caeteris paribus*, is due to lower pressure and not to differences in light or humidity; that generally acid solutions accelerate and alkaline solutions retard evaporation, but without relation to concentration; that evaporation is greater

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9 MAIGE, MME. G., Recherches sur la respiration de l'étamine et du pistil. Rev. Gén. Bot. **21**:32–38. 1909.

10 JENSEN, P. BOYSEN, Die Zersetzung des Zuckers während des Respirationsprozesses. Ber. Deutsch. Bot. Gesells. **26a**:666, 667. 1908.

11 SAMPSON, A. W., AND ALLEN, LOUISE M. Influence of physical factors on transpiration. Minn. Bot. Stud. **4**:33–59. 1909.